

What is claimed is:

1. A magnetic field transducer comprising:
a phase transition material exhibiting a change from an antiferromagnetic phase to a ferromagnetic phase when heated above a critical temperature;
a magnetic field source for applying a magnetic bias field to the phase transition material; and
a heat source for heating the phase transition material above the critical temperature.
2. The magnetic field transducer of claim 1, wherein the phase transition material is selected from a group consisting of: FeRh, and FeRhX, where X is one of Pd, Pt, Ir, Ru, Re or Os.
3. The magnetic field transducer of claim 1, wherein the phase transition material comprises a rare earth/transition metal alloy.
4. The magnetic field transducer of claim 1, wherein the phase transition material comprises a first section and a second section, and wherein the first section and the second section are separated to form a gap.
5. The magnetic field transducer of claim 1, wherein the magnetic field source comprises:
a conductor for applying the magnetic bias field to the phase transition material.
6. The magnetic field transducer of claim 1, wherein the heat source comprises:
a source of electromagnetic radiation; and
a waveguide for directing electromagnetic radiation from the source onto the phase transition material.
7. A magnetic recording head including a write pole comprising the transducer of claim 1.
8. A disc drive comprising:
a motor for supporting a storage medium;
the magnetic recording head of claim 1; and

an arm for positioning the magnetic recording head adjacent to the storage medium.

9. A method of producing a magnetic pulse, the method comprising:
providing a phase transition material;
applying a magnetic bias field to the phase transition material;
heating the phase transition material to cause the phase transition material to change from an antiferromagnetic phase to a ferromagnetic phase, thereby producing a magnetic pulse.

10. The method of claim 9, wherein the phase transition material comprises FeRh or FeRhX, wherein X is selected from the group of Pd, Pt, Ir, Ru, Re or Os.

11. The method of claim 9, wherein the phase transition material comprises a rare earth/transition metal alloy.

12. The method of claim 9, wherein the phase transition material comprises a first section and a second section, and wherein the first section and the second section are separated to form a gap.

13. The method of claim 9, wherein the step of applying a magnetic bias field to the phase transition material comprises:

passing an electric current through a conductor to apply the magnetic bias field to the phase transition material.

14. The method of claim 9, wherein the step of heating the phase transition material comprises:

directing an electromagnetic wave onto the phase transition material.

15. A method of recording data in a storage medium, the method comprising:

placing a phase transition material adjacent to a surface of the storage medium;

applying a magnetic bias field to the phase transition material;

heating the phase transition material to cause the phase transition material to change from an antiferromagnetic phase to a ferromagnetic phase, thereby producing a magnetic pulse; and

using the magnetic pulse to affect the magnetization of the storage medium.

16. The method of claim 15, wherein the phase transition material comprises FeRh or FeRhX, wherein X is selected from the group of Pd, Pt, Ir, Ru, Re or Os.

17. The method of claim 15, wherein the phase transition material comprises a rare earth/transition metal alloy.

18. The method of claim 15, wherein the phase transition material comprises a first section and a second section, and wherein the first section and the second section are separated to form a gap.

19. The method of claim 15, wherein the step of applying a magnetic bias field to the phase transition material comprises:

passing an electric current through a conductor to apply the magnetic bias field to the phase transition material.

20. The method of claim 15, wherein the step of heating the phase transition material comprises:

directing an electromagnetic wave onto the phase transition material.

21. A recording head for use with a data in a storage medium, the recording head comprising:

a write pole including a phase transition material;

a return pole magnetically coupled to the write pole;

a magnetic field source for applying a magnetic bias field to the phase transition material; and

a heat source for heating the phase transition material to cause the phase transition material to change from an antiferromagnetic phase to a ferromagnetic phase, thereby producing a magnetic pulse that can affect the magnetization of the storage medium.

22. The recording head of claim 21, wherein the phase transition material comprises FeRh or FeRhX, wherein X is selected from the group of Pd, Pt, Ir, Ru, Re or Os.

23. The recording head of claim 21, wherein the phase transition material comprises a rare earth/transition metal alloy.

24. The recording head of claim 21, wherein the phase transition material is divided into two sections, and the magnetic pulse is produced between the two sections.

25. The recording head of claim 21, wherein heat source comprises:
a source of an electromagnetic radiation; and
a waveguide for directing the electromagnetic radiation onto the phase transition material.